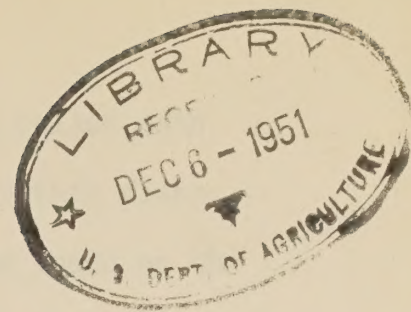


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QUICK-COOKING AND PRECOOKED FOODS

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Twenty years ago, most of the foods brought into the American home (except those to be eaten uncooked) required much time, effort, and skill on the part of the housewife. The making of cakes and pies called for patient care, soup-making was often a laborious art, preparation of food for babies called for much extra cooking, straining, and washing.

Today, the picture has changed. Much of the preparation and even some of the cooking has already been done when the housewife brings the food home from the store. A number of frozen and canned products are precooked and require only warming. Many others are thoroughly prepared for putting on the stove and require only brief cooking. Much of the mixing has already been done and it is possible to buy soups of all kinds, canned beef stews, corned beef hash, complete spaghetti dinners, and even complete dinners, including soups, meats with gravy, and vegetables, all precooked and ready for consumption merely by heating.

Such products find ready use by the Military, have been of value in emergency feeding in such cases as flood disasters, destructive fires, hurricanes, and tornadoes.

In the class of quick-cooking and precooked foods may be included quick-cooking cereals, precooked cereals, sieved and homogenized fruits, vegetables and meats, soups, and precooked frozen foods.

Quick-Cooking Cereals:

Two of the most important American products in this field are quick-





cooking rice and rolled oats. As is well known, quick-cooking rolled oats are simply made by rolling the steamed groats to produce a very thin flake. The exact commercial method of manufacturing precooked rice now found on the American market is not disclosed. Essentially, the process consists of soaking and cooking the cleaned rice, then dewatering, and finally dehydrating. The type of quick-cooking rice now found on the American market requires about 10 minutes for preparation, and the Bureau of Agricultural and Industrial Chemistry is engaged in research to find a product which can be cooked in less time. This is particularly important if such a product is to be used for the Military, where periods of only about one or two minutes are desired for preparation.

#### Precooked Cereals:

These preparations are used chiefly for infant foods and may be designated as "among baby's first solid foods." They also find use in diets of the aged, where a low residue diet is prescribed, and in emergency feedings in time of disaster. In general, they consist of mixtures of wheat, semolina, farina, oatmeal, cornmeal, with additives such as wheat germ, dried brewers' yeast, dicalcium phosphate, salt and iron. Such precooked cereal preparations may be dispensed in the dry form or may be canned, and, in the latter case, they may or may not be sieved.

#### Homogenized and Sieved Fruits and Vegetables:

Homogenized and sieved or chopped food preparations, because of their nutritive value and physical structure, are useful foods for infant feeding and for certain types of therapeutic diets. They also would be suitable in instances where people are under stress and the digestive process may be impaired. In the United States, the market for this type of product has expanded tremendously during the last 10 years. In 1950, the pack of strained vegetables amounted to 26,041,455 dozens and 39,448,175 dozens of strained

cooking rice and rolled cereals. In a well known, long-standing rolling case  
the staple made by rolling the steamed grains to produce a very thin layer.  
The exact commercial method of manufacturing rice paper also was found on the  
American market. In this respect, the process consists of rolling  
and cooking the steamed rice, then flattening and finally drying. The  
type of packaging used was found on the American market paper about  
10 different preparations, and the following ingredients and ingredients  
chemistry is engaged in research to find a satisfactory recipe worked in  
last time. This is particularly important in such a product as to be used  
for the market, where people only about one or two minutes are allowed  
for preparation.

Preparation of Rice Paper

These preparations are made directly for the market and may be  
described as "rice paper's first white form". They are found in those  
of the rice, which is for rice paper, and its necessary ingredients  
in the of steaming. In addition, they consist of rice, water, starch,  
sugar, oil, and other ingredients such as wheat, rice, dried fruit,  
yeast, and other ingredients, salt and sugar. Such products are prepared  
may be prepared in the rice form or may be prepared in the rice form,  
then they are not be stored.

Preparation of Rice Paper and Rice Paper

Preparation and storage of rice paper, because of their  
nutritive value and light color, are used for the following  
and for certain types of preparation in rice. They also may be suitable for  
the most common types of rice and other types and the rice paper process may be  
the most. In the United States, the rice paper type of product has  
increased tremendously during the last few years. In 1950, the pack of rice paper  
vegetables amounted to 20,000,000 pounds and 20,000,000 pounds of rice paper.



fruits. In the same period, production of chopped (so-called junior food because it is recommended for children over four years of age) vegetables amounted to 5,164,789 dozens and chopped fruits 9,828,641 dozens.

The methods of preparing commercially canned homogenized, sieved and chopped foods vary somewhat with the food and with the manufacturer. The raw materials are usually fresh fruits and vegetables, frequently grown and harvested under the supervision of the manufacturer. Some firms begin with fruits and vegetables that are already canned or with fruits which have been dried.

The general canning process begins with washing, together with peeling, skinning or blanching, according to the nature of the fruit or vegetables. In the preparation of chopped foods, the vegetable or fruit is mechanically chopped, precooked, and filled into cans, which are sealed and heat processed. In the preparation of foods with finely divided particles, the vegetable or fruit is heated in a closed kettle under light steam pressure until it is soft enough for sieving. It is then forced through a screen having fine apertures, usually 0.02 inch (0.05 cm.) in diameter. Coarse fibers that will not pass through the sieve are discarded. The sieved material is conducted to vacuum tanks where the water content may be adjusted to secure the desired consistency. The product then is vacuum packed and heat processed. Homogenized foods are further subdivided when the strained material is forced through stainless steel valves under 4,000 to 4,500 pounds' pressure after which they are vacuum packed and heat processed.

Research is under way, chiefly by private industry, in the field of product improvement, new products, and improved processing to maintain to a better degree the nutritive value of the product.

#### Precooked Frozen Foods:

It was not until about 1938 that precooked frozen foods were offered



fruit. In the same period, production of apples (so-called golden fruit) because it is recommended for children over four years of age) vegetables amounted to 2,184,799 dozens and changed fruit 9,528,041 dozens.

The methods of preparing commercially canned homogenized, sliced and chopped foods vary somewhat with the food and with the manufacturer. The raw materials are usually fresh fruits and vegetables, frequently grown and harvested under the supervision of the manufacturer. Some firms begin with fruits and vegetables that are already canned or with fruits which have been dried.

The general canning process begins with washing, together with peeling, skinning or blanching, according to the nature of the fruit or vegetable. In the preparation of chopped foods, the vegetables or fruits are mechanically chopped, crushed, and filled into cans, which are sealed and heat processed. In the preparation of foods with finely divided particles, the vegetables or fruits are passed to a closed machine under light steam pressure until it is soft enough for eating. It is then forced through a screen having fine openings, usually 0.05 inch (0.05 mm.) in diameter. Some fruits that will not pass through the screen are discarded. The slurry material is contacted to vacuum tanks where the water content may be adjusted to secure the desired consistency. The product then is vacuum packed and heat processed. Homogenized foods are prepared similarly, when the material intended to be forced through stainless steel screens under 4,000 to 4,500 pounds' pressure after which they are vacuum packed and heat processed.

Research in other way, mainly by private industry, in the field of product improvement, new products, and improved processing is confined to a limited degree the numerical value of the product.

Prepared Other Foods

It was not until about 1928 that processed frozen foods were offered



to the buying public in any appreciable quantities. Today, the commercial trade, including railroads and airlines, purchase significant quantities of cooked frozen foods. The following list of "ready to serve" products serves to illustrate the wide variety of foods offered to the American public:

Soups: Asparagus, chicken Louisiana, chicken noodle, New England clam chowder, mongol purée, onion, split green pea, cream of tomato, vegetable.

Entrees: Fish—Codfish cakes, creamed tuna, halibut cutlets, creamed salmon, salmon loaf, salmon steaks, shrimp a la King, whole shrimp, shrimp sandwich spread, seafoods a la King.

Meats—Beef hash, corned beef hash, meat loaf, filet mignon, beef liver, Manhattan steak with tomato sauce, meat balls (Spanish style), pot roast of beef, roast of beef in gravy, stuffed bell peppers, Swiss steak, vegetable and beef stew, beef tips with Spanish sauce, lamb chops, lamb cutlets, Irish lamb stew, roast lamb in gravy, pork chops, roast pork with dressing and gravy, sausage patties, veal fricassee, veal macaroni loaf.

Poultry—Chicken a la King, creamed chicken, chicken fricassee, minced chicken, chicken giblets and rice, chicken potpie, roast duck, turkey a la King, turkey hash, turkey loaf, roast turkey with dressing.

Specialties: Spaghetti and meatballs, chili con carne, baked beans with pork, rice dinner—Spanish style, lima beans baked with ham, macaroni and cheese, pumpkin pie mix, vegetable salad, Welsh rarebit, pancake batter, chop suey, barbecue sauce, giblet gravy, brown gravy, chicken gravy, hors d'oeuvres.

Bakery Products: Angel food cake, cup cakes, cookies, blueberry muffins, breakfast rolls, dinner rolls, fruit pies, mince and pumpkin pies.

Considerable research is still required on the development of formulas which will yield uniform products of superior flavor, texture, color, and consistency, and which will possess good keeping quality under proper conditions of packaging, freezing, storing, and reheating. As a result of researches of the Bureau of Agricultural and Industrial Chemistry, frozen cooked rice has been prepared. In taste tests it was found that the frozen rice was equal to freshly cooked rice in every respect, even after 8 months' storage at 10° F. Studies of individual products to determine their suscep-







tibility to bacterial contamination and preventing this are needed. The tissues of cooked foods have been softened and some of them may be more susceptible to spoilage than are uncooked ones. In this connection, the Bureau Agricultural and Industrial Chemistry is undertaking bacteriological studies on precooked frozen foods.

Other technical problems to be solved include the prevention of off-flavors caused by rancidity and by other chemical reactions through the use of antioxidants. A study, too, is necessary on the texture of precooked frozen foods. Such texture is dependent on several factors, e.g., natural texture of the food itself, combination of one or more raw materials, freezing, defrosting, and cooking. At the present time, the Bureau of Agricultural and Industrial Chemistry, as well as private industry, is engaged in investigating some of these problems.

The quality of such frozen foods as sauces, cream soups, and unbaked batters and doughs may depend on their stability as colloids and their ability to hold the water phase. In this connection, the Bureau of Agricultural and Industrial Chemistry has found that rice flour will yield a smooth sauce after defrosting, whereas sauces from wheat flour will curdle.

#### Newer Processes for Precooked Foods:

There are two processes still in the experimental stage. One of these is the treatment of foods with cathode rays or with gamma rays obtained from the residue of plutonium preparation. In the former case, machines have been built to accomplish this on a pilot plant scale. Gamma ray treatment is still very much in the laboratory phase.

The second method is the use of antibiotics in canning. Use of antibiotics may permit lower processing temperatures for low-acid foods. This method is still in the laboratory stage.





At the present time, the Bureau of Agricultural and Industrial Chemistry is not engaged in work with either cathode or gamma rays. The machines necessary for cathode ray irradiation are quite expensive, and work with gamma rays requires rather elaborate protection for safety of personnel.

Use of antibiotics in canning originated in the Bureau of Agricultural and Industrial Chemistry, and research has now been started by private industry and in several State Experiment Stations, both in the United States and in foreign countries.

Summary:

There are several quick-cooking and precooked foods on the market available for use in times of emergency feeding. Research is needed to widen the field and usefulness of this type of product; evaluation of new products, and better methods of processing.

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